

SAFETY STOPPER FOR A WELDING TORCH STRIKER

This application claims priority to co-owned, co-pending U.S. provisional application Serial Number 60/438,834, filed January 9, 2003.

TECHNICAL FIELD

[0001] This invention relates generally to safety improvements in hand tools that construction workers carry on their belt for use on a construction site.

BACKGROUND OF THE INVENTION

[0002] Some construction workers on site carry tools hanging low from their belt. Welders and fabricators, in particular, carry hanging from their belt a welding torch striker (i.e. spark lighter) of the type used to light an oxy-acetylene torch for “burning” or cutting metal. The strike plate and arms of a typical prior art striker defines an elongated open area that has a tendency to catch on protruding objects, for example re-bar, steel cable, etc., or posts, hooks, etc., protruding from equipment. A striker catching on a protruding object can throw the construction worker off-balance. This tendency to catch on protruding objects poses a significant safety hazard to a construction worker who is working on a partially constructed bridge or high-rise building.

SUMMARY OF THE INVENTION

[0003] The invention provides a safety stopper for use with a striker or spark lighter of the type used by welders and fabricators to light welding torches. The striker has a handle region including a substantially U-shaped spring handle. The spring handle defines a first arm with a first push-tab and a second arm with a second push-tab, and the arms are joined to form a bend or coil at a proximal end of the striker. At least one flint is mounted to a distal end of the first arm, and a strike plate is mounted to a distal end of the second arm. The spring handle and the strike plate

define an open area. (It is this open area that tends to catch on protruding objects). The safety stopper includes a cover shaped to cover a substantial portion of the open area, and shaped to expose the strike plate and at least one flint. The safety stopper also includes attachment means for attaching the cover to the striker, such that the cover defines a clear path for movement of a first push-tab with respect to a second push-tab, and such that the cover, when attached to the striker, defines a clear path for movement of the first push-tab with respect to the second push-tab; such that when the striker, with the safety stopper attached, is carried hands-free attached to an operator's belt, the safety stopper reduces the chances of the operator being thrown off balance by the striker catching on an external object.

[0004] In a first preferred embodiment, shaped for a Pearson model 2001 striker, the cover is a sleeve made of a flexible, non-flammable, heat-resistant material, preferably leather. The attachment means includes a sleeve shaped and sized to hold the safety stopper by spring force exerted outward on the sleeve by the first and second arms. The sleeve includes a single sheet folded to produce a fold and first and second facing open edges, the first and second facing open edges attached by stitching. The coil at the proximal end of the striker protrudes beyond the proximal end of the safety stopper

[0005] In a second embodiment, a sleeve made of a flexible, non-flammable, heat-resistant material is cut to fit a Pearson model 4501 striker.

[0006] In a third embodiment, the cover is shaped as a sock. The attachment means includes a grommet penetrating the sock near the sock's proximal closed end. The attachment means also includes at least one rivet penetrating the sock within the bend or coil near the sock's distal open end.

[0007] In a fourth embodiment, the cover includes a rigid plate made of a non-flammable, heat-resistant material, and two clip-on fasteners adapted to clip the rigid plate to the spring handle.

[0008] In a fifth embodiment, the cover includes a single rigid plate defining at least one peripheral groove on a first long edge of the plate, and an overlapping portion along a second long edge of the plate.

[0009] In a sixth embodiment, the cover includes two rigid plates configured for clamp-on attachment of the plates to the striker, a first rigid plate having at least one integral spacer and a second rigid plate having at least one socket sized to accept the at least one integral spacer.

[0010] More generally, the invention provides a safety stopper for use with a hand tool defining an open area, the safety stopper comprising, in combination, a cover shaped to cover a substantial portion of the open area and shaped to expose an active component of the tool; and attachment means for attaching the cover to the tool; such that the safety stopper when attached to the tool defines a clear path for movement of a trigger component of the tool; and such that when the tool with the safety stopper attached is carried hands-free attached to an operator's belt, the safety stopper reduces the chances of the operator being thrown off balance by the tool catching on an external object.

[0011] The invention also provides a safety striker for use by welders and fabricators to light torches. The safety striker includes a substantially U-shaped spring handle. The spring handle defines a first swinging arm with a first push-tab and a second arm with a second push-tab, the arms joined to form a bend at a proximal end of the striker. The safety striker further includes at least one flint mounted to a distal end of the first arm, a strike plate mounted to a distal end of the second arm (the spring handle and the strike plate defining an open area), and a safety stopper. The safety stopper includes a cover shaped to cover a substantial portion of the open area, and shaped to expose the strike plate and at least one flint. The safety stopper further includes attachment means for attaching the cover to the striker such that the safety stopper, when attached to the striker, defines a clear path for movement of a first push-tab with respect to a second push-tab, and such that when the striker, with the safety stopper attached, is carried hands-free attached to an operator's belt, the safety stopper reduces the chances of the operator being thrown off balance by the striker catching on an external object. In a preferred embodiment of the safety striker, the attachment means includes a grommet penetrating the cover of the safety stopper within the bend. Another embodiment of the safety striker includes a rigid metallic

cover in sliding, overlapping relationship to the first swinging arm tack-welded to the second arm.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIGS. 1 and 2 are drawings that show front view and rear view, respectively, of a safety stopper comprising a sleeve for use with a Pearson model 2001 striker in accordance with a first preferred embodiment of the invention.

[0013] FIGS. 3 and 4 (prior art) show a Pearson model 2001 striker.

[0014] FIG. 5 shows a Pearson model 2001 striker blocked by the safety stopper of FIGS. 1 and 2, as the striker would be carried by a construction worker.

[0015] FIG. 6 (prior art) shows a Pearson model 2001 striker as typically carried by a construction worker.

[0016] FIGS. 7 and 8 (prior art) show side and front views respectively of a Lawson products tip cleaner that may be carried in a pouch of the safety stopper of FIGS. 1 and 2.

[0017] FIGS. 9-15 (prior art) show the relative size of various items associated with strikers used with the invention.

[0018] FIG. 9 (prior art) shows the Pearson model 2001 striker.

[0019] FIG. 10 (prior art) shows a cartridge containing spare flints for the Pearson model 2001 striker.

[0020] FIG. 11 (prior art) shows a spring latch used to hang a striker from the construction worker's belt or hammer strap.

[0021] FIG. 12 (prior art) shows the tip cleaner of FIGS. 7A and 7B folded.

[0022] FIG. 13 (prior art) shows a tip cutter used to flatten the end of a burner tip.

[0023] FIG. 14 (prior art) shows a Pearson model 4501 striker.

[0024] FIG. 15 (prior art) shows the triple-flint mount used in the Pearson model 4501.

[0025] FIG. 16 is a front view of a second embodiment of a safety stopper for use with a Pearson model 4501 striker having a triple-flint mount.

[0026] FIG. 17 is a rear view of the safety stopper of FIG. 16 with the flint mount pouch open to show detail.

[0027] FIG. 18 is a front view of a third embodiment of a safety stopper having a cover shaped as a sock.

[0028] FIG. 19 is a front view of a fourth embodiment of a safety stopper comprising a single rigid clip-on plate.

[0029] FIG. 20 is a side view of the safety stopper of FIG. 19.

[0030] FIG. 21 is a cross-section view along A-A of the safety stopper of FIG. 19.

[0031] FIG. 22 is a front view of a fifth embodiment of a safety stopper including a single rigid plate having a peripheral groove adapted to secure the proximal end of the rigid plate within the bend of the striker.

[0032] FIG. 23 is a section view across A-A of FIG. 22.

[0033] FIG. 24 is a section view across B-B of FIG. 22.

[0034] FIG. 25 is a side view of striker 40 with a partial cross section of the proximate end of safety stopper 90.

[0035] FIG. 26 is a front view of a sixth embodiment of a safety stopper showing the striker sandwiched between two rigid plates.

[0036] FIG. 27 is a side view of the safety stopper of FIG. 26 showing a partial cross-section of the safety stopper across A-A of FIG. 26.

[0037] FIG. 28 is a partial cross-section of the safety stopper across B-B of FIG. 26.

DETAILED DESCRIPTION OF THE INVENTION

[0038] The invention provides a safety stopper for use with a striker or spark lighter of the type used by welders and fabricators to light torches, and also a safety striker including a safety stopper.

[0039] FIG. 1 is a front view of a first preferred embodiment of a safety stopper, safety stopper 20, in accordance with the invention. FIG. 2 is a rear view of safety stopper 20 of FIG. 1.

[0040] The Pearson model 2001 striker 40 (prior art) is shown in front view and side view, respectively, in FIGS. 3 and 4. FIG. 3 shows striker 40 having a substantially U-shaped spring handle 43 defining a proximal handle region including first arm 46 with a first push-tab 48 and a second arm 47 with a second push-tab 49,

the arms joined to form a bend 42 at a proximal end of the striker. At the distal end of the striker, flint 45 is mounted to the distal end of first arm 46, and strike plate 44 is mounted to the distal end of second arm 47. The spring handle and the strike plate define elongated open area 41. Elongated open area 41, shown in FIG. 3 as being defined by arms 46 and 47 and strike plate 44 of the striker, is the source of the hazard that is addressed by the invention.

[0041] Returning to FIG. 1, safety stopper 20 includes an elongated cover 21 having a tough outer face, herein below referred to “sleeve portion 21”. Sleeve portion 21 is shaped to substantially cover elongated open area 41. Front face 24 of safety stopper 20 prevents protruding objects in the environment in which the worker operates from entering and catching on the sides of elongated open area 41. By doing so it reduces the chances of the striker catching on an external object, thus providing a safety feature.

[0042] Front face 24, including the exposed part of sleeve portion 21 and the exposed parts of pouches 31 and 32, has a smooth, tough outer face. Sleeve portion 21, at least the portion between fold 25 and stitching 26, is made of a flexible, non-flammable, heat-resistant material such as leather.

[0043] As illustrated in FIG. 3, bend 42 of the model 2001 striker is a coil spring. In other versions of the striker, bend 42 could be a simple half-turn bend rather than the coil spring of the model 2001 striker. Herein below bend 42 is also referred to as “coil spring 42”.

[0044] Referring to FIG. 1, proximal opening 22 in sleeve portion 21 allows coil spring 42 of the model 2001 striker to protrude. This permits the striker to be suspended from spring latch 29. Spring latch 29, as shown again in FIGS. 5 and 6, may hook onto hammer strap 55 or onto the construction worker’s belt 56.

[0045] Referring again to FIG. 1, distal opening 23 in elongated cover (sleeve) 21 allows the strike plate and flint to protrude beyond distal opening 23 of sleeve 21.

[0046] FIG. 5 shows a Pearson model 2001 striker 40 with safety stopper 20 suspended from a construction worker’s hammer strap 55. It can be seen that this permits the striker to be used to re-light a torch burner without needing to unhook the striker. Additionally, the flexibility of sleeve 21 shown in FIG. 1, and protrusion of

the strike plate and flint beyond distal opening 23, also shown in FIG. 1, permits the striker to be used to re-light a torch burner without needing to remove or retract the sleeve. The flexibility of the sleeve allows push tabs 48 and 49 on first and second arms 46 and 47 (shown in FIG. 3) to be pushed together within the sleeve by the operator's hand outside the sleeve. FIG. 6 (prior art) shows a Pearson model 2001 striker, without a safety stopper, suspended from the construction worker's hammer strap.

[0047] As illustrated in FIGS. 1 and 2, safety stopper 20 includes pouches 31, 32 and 35, preferably mounted front and rear, for storing striker accessories. Outer front pouch 31 and inner front pouch 32 are both closed by front flap 33 having a press-stud fastener 34. Rear pouch 35 is closed by rear flap 36 having a press-stud fastener 37.

[0048] The Pearson model 2001 striker 40 is drawn to scale in FIG. 9, and its accessories are shown in FIGS. 10 to 13 drawn to the same scale to show their relative size. Likewise, the Pearson model 4501 striker 61 is drawn to scale in FIG. 14 and its triple-flint mount 62, shown in FIG. 15, is drawn to the same scale to show its relative size.

[0049] Accessories of the Pearson model 2001 striker include a spare flints cartridge, tip cleaner, and a tip cutter. Spare flints cartridge 51 is shown containing five spare flints in FIG. 10. Tip cleaner 52 is illustrated in FIGS. 7 and 8, and is shown folded in FIG. 12. Tip cutter 53 is illustrated in FIG. 13. Tip cleaner 52 and tip cutter 53 may be used with either the Pearson model 2001 striker 40 or the Pearson model 4501 striker 61.

[0050] Safety stopper 60, substantially covering a Pearson model 4501 striker 61 in accordance with a second embodiment of the invention, is shown in FIGS. 16 and 17. FIG. 16 shows the front face of the safety stopper with the front pouches closed. FIG. 17 shows the rear face of the safety stopper with the rear pouch open.

[0051] FIGS. 16 and 17 show the Pearson model 4501 striker having a triple-flint mount 62. FIG. 17 shows flint-mount pouch 63, having sockets 64 for holding a triple-flint mount. Safety stopper 60 is shaped to allow for replacement of the triple-flint mount 62 of striker 61 without the need to remove or retract the shield.

[0052] A third embodiment of a safety stopper is illustrated in FIG. 18. This third embodiment has an elongated cover shaped as a sock and made of a flexible, non-flammable, heat-resistant material. FIG. 18 is a front view of safety stopper 70 having a sock portion 71, a grommet 72 at the proximate closed end of the sock end of the striker, the grommet positioned within the bend of the striker. Preferably, the third embodiment also includes a plurality of rivets 73 penetrating the distal open end of the sock. Preferably, the sock includes stitching 74 along one side and around the distal end of the sock.

[0053] This third embodiment may also include pockets.

[0054] The front face of safety stopper 70, including the exposed part of sock portion 71 and the exposed parts of front pouches, if any, has a smooth, tough outer face. Sock portion 71 is made of a flexible, non-flammable, heat-resistant material such as leather.

[0055] A fourth embodiment of a safety stopper is illustrated in FIGS. 19 and 20. This fourth embodiment has a single rigid clip-on plate portion. FIG. 19 is a front view of safety stopper 80 having a single rigid clip-on plate 81. Safety stopper 80 includes proximal clip-on fastener 82 and distal clip-on fastener 84, both preferably integrally molded with plate 81 to form safety stopper 80. Proximal clip-on fastener 82 defines proximal slot 83, and distal clip-on fastener 84 defines distal slot 85.

[0056] The front face of safety stopper 80, including the exposed part of plate 81 and the exposed parts of attached front pouches have a smooth, tough outer face. Sock portion 71 is made of a rigid, non-flammable, heat-resistant material such as a molded thermo-setting plastic material.

[0057] FIG. 20 is a side view of safety stopper 80. FIG. 19 locates proximal clip-on fastener 82, proximal slot 83, distal clip-on fastener 84, and distal slot 85. FIG. 21, a cross-section view across A-A of the safety stopper of FIG. 19 shows detail of proximal slot 83.

[0058] A fifth embodiment of a safety stopper is illustrated in FIGS. 22-26. In this fifth embodiment, as shown in FIG. 22, safety stopper 90 includes a single rigid plate 91 defining at least one peripheral groove on a first long edge of the plate, and an overlapping portion along a second long edge of the plate. Preferably, rigid

plate 91 is made of stiff leather. The area of the plate covering the coil spring of the striker is split in the plane of the striker to form deep peripheral groove 94 in the proximal end of plate 91. In a plane transverse to the plane of the striker the same area defines a first aperture 92 for accommodating a spring latch, and defines a second aperture for accepting rivet 93. (Alternatively, a grommet through a single aperture could be used). Deep peripheral groove 94 extends as a proximal shallow peripheral groove 95 along a first long edge of the plate 91. Shallow peripheral groove 97 is separated from shallow peripheral groove 95 by slot 96 to accommodate second push tab 49. Overlapping portion 98 of plate 91 overlaps swinging arm 99 of the striker to allow movement of first push-tab 48.

[0059] FIG. 23 is a section view across A-A of FIG. 22 showing overlapping portion 98 of plate 91, swinging arm 99, and proximal shallow peripheral groove 95 in cross-section. FIG. 24 is a partial cross-section near the distal end of safety stopper 90 showing distal shallow peripheral groove 97 in cross-section.

[0060] FIG. 25 is a side view of striker 40 with a partial cross section of the proximate end of safety stopper 90 showing deep peripheral groove 94 and bend 42 (coil spring) in cross-section.

[0061] A sixth embodiment of a safety stopper is illustrated in FIGS. 26-28. In this sixth embodiment, the striker is sandwiched between two rigid clamping plates. FIG. 26 is a front view of safety stopper 100 having a front plate 101 and a rear plate 102. The plates are preferably both made of a rigid, non-flammable, heat-resistant material such as metal or a molded thermo-setting plastic material. FIG. 27 is a side view of the safety stopper of FIG. 26. FIG 27 includes a partial cutaway view across A-A of FIG. 26 of front plate 101, rear plate 102, proximal spacer 103 and proximal slot 104. Proximal spacer 103 and distal spacers 105 and 107 attach front plate 101 to rear plate 102. The spacers are preferably made of the same material as the plates. In FIGS. 27 and 28, the spacers are shown molded with front plate 101, rear plate 102 having corresponding slots 104 and 106, respectively, for attachment of the front plate to the rear plate. FIG. 27 shows spacer 103 and its corresponding slot 104. FIG. 28 shows spacer 105 pressed into its

corresponding slot 106. Spacer 107 is pressed into its corresponding slot 108 (not shown).

[0062] A seventh embodiment of the safety stopper (not shown) is a rigid metallic cover, shaped like cover 91 of FIG. 22, in sliding, overlapping relationship to the first swinging arm, and tack-welded to the second arm.

[0063] A first preferred embodiment of a safety striker of the invention includes a substantially U-shaped spring handle, the spring handle defining a first arm with a first push-tab and a second arm with a second push-tab, the arms joined to form a bend at a proximal end of the striker, at least one flint mounted to a distal end of the first arm, a strike plate mounted to a distal end of the second arm, the spring handle and the strike plate defining an elongated open area, and a safety stopper including an elongated cover having a tough outer face, the elongated cover configured to cover a substantial portion of the elongated open area such that when an operator is carrying the striker hands-free with the striker attached to the operator's belt, and such that the elongated cover reduces the chances of the striker catching on an external object.

[0064] In the first preferred embodiment of a safety striker, the elongated cover is shaped as a sock and the attachment means includes a grommet penetrating the sock within the bend near the sock's closed proximal end.

[0065] Pouches are an important aspect of the invention but they are not essential to the safety function. In alternative embodiments of the invention, the safety stopper has no pouches. Other embodiments include one or more pouches only on the rear for greater safety. Yet other embodiments include one or more pouches on the front for greater convenience.

[0066] The teaching of the invention may also be used, with appropriate modification the attachment means, to produce a safety stopper for other tools that are carried attached to a worker's clothing, and that define an open area posing a safety risk to the worker because of the likelihood of protruding objects, in the environment in which the worker operates, catching on an external object and throwing the operator off balance.

[0067] A preferred embodiment of a safety striker, assembled by a striker manufacturer, includes a cover shaped as a sock attached to the striker by a grommet

as described above as the third embodiment. Note that the first preferred embodiment describes a safety stopper that may be attached to the striker by an operator